

## SEQUENCE LISTING

Biogen Idec Inc.
Anderson, Darrell R.
Rastetter, William H.
Hanna, Nabil
Leonard, John E.
Newman, Roland
Reff, Mitchell

- <120> ANTI-CD20 ANTIBODIES
- <130> 27693-01008
- <140> 09/911,703
- <141> 2001-07-25
- <150> US 08/475,813
- <151> 1995-06-07
- <150> US 08/149,099
- <151> 1993-11-03
- <150> US 07/978,891
- <151> 1992-11-13
- <160> 11
- <210> 1
- <211> 8540
- <212> DNA
- <213> Artificial Sequence
- <220>
- <223> vector
- <400> 1

gacqtcqcgq ccqctctaqq cctccaaaaa agcctcctca ctacttctgq aatagctcag 60 aggeegagge ggeeteggee tetgeataaa taaaaaaaat tagteageea tgeatgggge 120 ggagaatggg cggaactggg cggagttagg ggcgggatgg gcggagttag gggcgggact 180 atggttgctg actaattgag atgcatgctt tgcatacttc tgcctgctgg ggagcctggg 240 gactttccac acctggttgc tgactaattg agatgcatgc tttgcatact tctgcctgct 300 ggggagcctg gggactttcc acaccctaac tgacacacat tccacagaat taattcccct 360 agttattaat agtaatcaat tacggggtca ttagttcata gcccatatat ggagttccgc 420 480 gttacataac ttacggtaaa tggcccgcct ggctgaccgc ccaacgaccc ccgcccattg acgtcaataa tgacgtatgt tcccatagta acgccaatag ggactttcca ttgacgtcaa 540 tgggtggact atttacggta aactgcccac ttggcagtac atcaagtgta tcatatgcca 600 agtacgcccc ctattgacgt caatgacggt aaatggcccg cctggcatta tgcccagtac 660 720 atgacettat gggaetttee taettggeag taeatetaeg tattagteat egetattace atggtgatgc ggttttggca gtacatcaat gggcgtggat agcggtttga ctcacgggga 780 tttccaagtc tccaccccat tgacgtcaat gggagtttgt tttggcacca aaatcaacgg 840 gactttccaa aatgtcgtaa caactccgcc ccattgacgc aaatgggcgg taggcgtgta 900 cggtgggagg tctatataag cagagctggg tacgtgaacc gtcagatcgc ctggagacgc 960 catcacagat ctctcaccat qaqqqtcccc gctcagctcc tggggctcct gctgctctgg 1020 ctcccaggtg cacgatgtga tggtaccaag gtggaaatca aacgtacggt ggctgcacca 1080 totgtottca tottocogco atotgatgag cagttgaaat otggaactgo ototgttgtg 1140 tgcctgctga ataacttcta tcccagagag gccaaagtac agtggaaggt ggataacgcc 1200

		ggagagtgtc				1260
agcctcagca	gcaccctgac	gctgagcaaa	gcagactacg	agaaacacaa	agtctacgcc	1320
tgcgaagtca	cccatcaggg	cctgagctcg	cccgtcacaa	agagcttcaa	caggggagag	1380
tgttgaattc	agatccgtta	acggttacca	actacctaga	ctggattcgt	gacaacatgc	1440
ggccgtgata	tctacgtatg	atcagcctcg	actgtgcctt	ctagttgcca	gccatctgtt	1500
gtttgcccct	ccccgtgcc	ttccttgacc	ctggaaggtg	ccactcccac	tgtcctttcc	1560
		atcgcattgt				1620
		gggggaggat				1680
		agctggggct				1740
		cccgcctggc				1800
		tacgtattag				1860
		ggatagcggt				1920
		ttgttttggc				1980
						2040
		acgcaaatgg				2100
		ctcacattca				
		gctcttcctt				2160
		cctggcaccc				2220
		ggactacttc				2280
		gcacaccttc				2340
		cgtgccctcc				2400
aacgtgaatc	acaagcccag	caacaccaag	gtggacaaga	aagcagagcc	caaatcttgt	2460
gacaaaactc	acacatgccc	accgtgccca	gcacctgaac	tcctgggggg	accgtcagtc	2520
ttcctcttcc	ccccaaaacc	caaggacacc	ctcatgatct	cccggacccc	tgaggtcaca	2580
tgcgtggtgg	tggacgtgag	ccacgaagac	cctgaggtca	agttcaactg	gtacgtggac	2640
ggcgtggagg	tgcataatgc	caagacaaag	ccgcgggagg	agcagtacaa	cagcacgtac	2700
		cgtcctgcac				2760
		cctcccagcc				2820
		ggtgtacacc				2880
		cctggtcaaa				2940
		ggagaacaac				3000
		cagcaagctc				3060
		gatgcatgag				3120
		atgaggatcc				3180
		gatatctacg				3240
		ccctcccccg				3300
		aatgaggaaa				3360
		gggcaggaca				3420
		ggctctatgg				3480
		ctcaatttct				3540
		agttgattga				3600
	_	ataaggacaa		-		3660
		gcacagcatt				3720
		accttggtaa				3780
		tataaggtga				3840
						3900
		gcttggatag				3960
		gcgtgaaggc				
		cgtcgccgtg				4020
		caggaacgag				4080
		gaatctggtg				4140
		aaaggacaga				4200
		ttttcttgcc				4260
		taaagtagac				4320
		accaggccac				4380
		tttcccagaa				4440
		tgaggtccag				4500
		acaggaagat				4560
tcatgcattt	ttataagacc	atgggacttt	tgctggcttt	agatcagcct	cgactgtgcc	4620

ttctagttgc	cagccatctg	ttgtttgccc	ctcccccgtg	ccttccttga	ccctggaagg	4680
tgccactccc	actgtccttt	cctaataaaa	tgaggaaatt	gcatcgcatt	gtctgagtag	4740
gtgtcattct	attctggggg	gtggggtggg	gcaggacagc	aagggggagg	attgggaaga	4800
caatagcagg	catgctgggg	atgcggtggg	ctctatggaa	ccagctgggg	ctcgagctac	4860
tagctttgct	tctcaatttc	ttatttgcat	aatgagaaaa	aaaggaaaat	taattttaac	4920
accaattcag	tagttgattg	agcaaatgcg	ttgccaaaaa	ggatgcttta	gagacagtgt	4980
tctctgcaca	gataaggaca	aacattattc	agagggagta	cccagagctg	agactcctaa	5040
				tcatcaccga		5100
				ggatagagag		5160
agggcagagc	atataaggtg	aggtaggatc	agttgctcct	cacatttgct	tctgacatag	5220
ttgtgttggg	agcttggatc	gatcctctat	ggttgaacaa	gatggattgc	acgcaggttc	5280
tccggccgct	tgggtggaga	ggctattcgg	ctatgactgg	gcacaacaga	caatcggctg	5340
ctctgatgcc	gccgtgttcc	ggctgtcagc	gcaggggcgc	ccggttcttt	ttgtcaagac	5400
cgacctgtcc	ggtgccctga	atgaactgca	ggacgaggca	gcgcggctat	cgtggctggc	5460
				actgaagcgg		5520
				tctcaccttg		5580
				acgcttgatc		5640
				cgtactcgga		5700
tcttgtcgat	caggatgatc	tggacgaaga	gcatcagggg	ctcgcgccag	ccgaactgtt	5760
				gtcgtgaccc		5820
				ggattcatcg	•	5880
				acccgtgata		5940
				ggtatcgccg		6000
				tgagcgggac		6060
				atttcgattc		6120
				ccggctggat		6180
				tgtttattgc		6240
				aagcattttt		6300
				atgtctggat		6360
				tcctgtgtga		6420
				gtgtaaagcc		6480
				gcccgctttc		6540
				ggggagaggc		6600
				ctcggtcgtt		6660
				cacagaatca		6720
				gaaccgtaaa		6780
tgctggcgtt	tttccatagg	ctccgccccc	ctgacgagca	tcacaaaaat	cgacgctcaa	6840
				ggcgtttccc		6900
				atacctgtcc		6960
				gtatctcagt		7020
tcgttcgctc	caagctgggc	tgtgtgcacg	aaccccccgt	tcagcccgac	cgctgcgcct	7080
tatccggtaa	ctatcgtctt	gagtccaacc	cggtaagaca	cgacttatcg	ccactggcag	7140
cagccactgg	taacaggatt	agcagagcga	ggtatgtagg	cggtgctaca	gagttcttga	7200
agtggtggcc	taactacggc	tacactagaa	ggacagtatt	tggtatctgc	gctctgctga	7260
agccagttac	cttcggaaaa	agagttggta	gctcttgatc	cggcaaacaa	accaccgctg	7320
gtagcggtgg	tttttttgtt	tgcaagcagc	agattacgcg	cagaaaaaaa	ggatctcaag	7380
				gaacgaaaac		7440
				gatcctttta		7500
				gtctgacagt		7560
				ttcatccata		7620
				atctggcccc		7680
				agcaataaac		7740
				ctccatccag		7800
				tttgcgcaac		7860
				ggcttcattc		7920
				caaaaaagcg		7980
				gttatcactc		8040
	=	-				

```
cagcactgca taattctctt actgtcatgc catccgtaag atgcttttct gtgactggtg
                                                                    8100
agtactcaac caagtcattc tgagaatagt gtatgcggcg accgagttgc tcttgcccgg
                                                                    8160
cgtcaatacg ggataatacc gcgccacata gcagaacttt aaaagtgctc atcattggaa
                                                                    8220
aacgttette ggggegaaaa eteteaagga tettaeeget gttgagatee agttegatgt
                                                                    8280
aacccactcg tgcacccaac tgatcttcag catcttttac tttcaccagc gtttctgggt
                                                                    8340
gagcaaaaac aggaaggcaa aatgccgcaa aaaagggaat aagggcgaca cggaaatgtt
                                                                    8400
                                                                    8460
gaatactcat actetteett ttteaatatt attgaageat ttateagggt tattgtetea
                                                                    8520
tgagcggata catatttgaa tgtatttaga aaaataaaca aataggggtt ccgcgcacat
                                                                    8540
ttccccgaaa agtgccacct
<210> 2
<211> 9209
<212> DNA
<213> Artificial Sequence
<220>
<223> vector with chimeric antibody sequence
<400> 2
gacgtcgcgg ccgctctagg cctccaaaaa agcctcctca ctacttctgg aatagctcag
                                                                      60
aggccgaggc ggcctcggcc tctgcataaa taaaaaaaat tagtcagcca tgcatggggc
                                                                     120
ggagaatggg cggaactggg cggagttagg ggcgggattag gggcgggact
                                                                     180
atggttgctg actaattgag atgcatgctt tgcatacttc tgcctgctgg ggagcctggg
                                                                     240
gactttccac acctggttgc tgactaattg agatgcatgc tttgcatact tctgcctgct
                                                                     300
ggggagcctg gggactttcc acaccctaac tgacacacat tccacagaat taattcccct
                                                                     360
agttattaat agtaatcaat tacggggtca ttagttcata gcccatatat ggagttccgc
                                                                     420
gttacataac ttacggtaaa tggcccgcct ggctgaccgc ccaacgaccc ccgcccattg
                                                                     480
acgtcaataa tgacgtatgt tcccatagta acgccaatag ggactttcca ttgacgtcaa
                                                                     540
                                                                     600
tgggtggact atttacggta aactgcccac ttggcagtac atcaagtgta tcatatgcca
agtacgccc ctattgacgt caatgacggt aaatggcccg cctggcatta tgcccagtac
                                                                     660
atgaccttat gggactttcc tacttggcag tacatctacg tattagtcat cgctattacc
                                                                     720
atggtgatgc ggttttggca gtacatcaat gggcgtggat accggtttga ctcacgcgga
                                                                     780
tttccaagtc tccaccccat tgacgtcaat gggagtttgt tttggcacca aaatcaacgg
                                                                     840
gactttccaa aatgtcgtaa caactccgcc ccattgacgc aaatgggcgg taggcgtgta
                                                                     900
cggtgggagg tctatataag cagagctggg tacgtgaacc gtcagatcgc ctggagacgc
                                                                     960
catcacagat ctctcactat ggattttcag gtgcagatta tcagcttcct gctaatcagt
                                                                    1020
getteagtea taatgteeag aggaeaaatt gtteteteee agteteeage aateetgtet
                                                                    1080
                                                                    1140
gcatctccag gggagaaggt cacaatgact tgcagggcca gctcaagtgt aagttacatc
cactggttcc agcagaagcc aggatcctcc cccaaaccct ggatttatgc cacatccaac
                                                                    1200
ctggcttctg gagtccctgt tcgcttcagt ggcagtgggt ctgggacttc ttactctctc
                                                                    1260
                                                                    1320
acaatcagca gagtggaggc tgaagatgct gccacttatt actgccagca gtggactagt
aacccacca cgttcggagg ggggaccaag ctggaaatca aacgtacggt ggctgcacca
                                                                    1380
totgtottca tottcccgcc atotgatgag cagttgaaat otggaactgc ototgttgtg
                                                                    1440
tgcctgctga ataacttcta tcccagagag gccaaagtac agtggaaggt ggataacgcc
                                                                    1500
ctccaatcgg gtaactccca ggagagtgtc acagagcagg acagcaagga cagcacctac
                                                                    1560
agcctcagca gcaccctgac gctgagcaaa gcagactacg agaaacacaa agtctacgcc
                                                                    1620
tgcgaagtca cccatcaggg cctgagctcg cccgtcacaa agagcttcaa caggggagag
                                                                    1680
tgttgaattc agatccgtta acggttacca actacctaga ctggattcgt gacaacatgc
                                                                    1740
ggccgtgata tctacgtatg atcagcctcg actgtgcctt ctagttgcca gccatctgtt
                                                                    1800
gtttgcccct cccccgtgcc ttccttgacc ctggaaggtg ccactcccac tgtcctttcc
                                                                    1860
taataaaatg aggaaattgc atcgcattgt ctgagtaggt gtcattctat tctggggggt
                                                                    1920
ggggtggggc aggacagcaa gggggaggat tgggaagaca atagcaggca tgctggggat
                                                                    1980
gcqgtgggct ctatggaacc agctggggct cgacagctat gccaagtacg ccccctattg
                                                                    2040
acqtcaatga cggtaaatgg cccgcctggc attatgccca gtacatgacc ttatgggact
                                                                    2100
ttcctacttg gcagtacatc tacgtattag tcatcgctat taccatggtg atgcggtttt
                                                                    2160
ggcagtacat caatgggcgt ggatagcggt ttgactcacg gggatttcca agtctccacc
                                                                    2220
ccattgacgt caatgggagt ttgttttggc accaaaatca acgggacttt ccaaaatgtc
                                                                    2280
```

gtaacaactc	cgccccattg	acgcaaatgg	gcggtaggcg	tgtacggtgg	gaggtctata	2340
taagcagagc	tgggtacgtc	ctcacattca	gtgatcagca	ctgaacacag	acccgtcgac	2400
atgggttgga	gcctcatctt	gctcttcctt	gtcgctgttg	ctacgcgtgt	cctgtcccag	2460
	agcagcctgg					2520
	ctggctacac					2580
	tggaatggat					2640
-	aaggcaaggc					2700
	gcctgacatc					2760
						2820
	actggtactt					2880
	agggcccatc					2940
	ccctgggctg					
	gcgccctgac					3000
	ccctcagcag					3060
	acgtgaatca					3120
	acaaaactca					3180
	tcctcttccc					3240
	gcgtggtggt					3300
	gcgtggaggt					3360
agcacgtacc	gtgtggtcag	cgtcctcacc	gtcctgcacc	aggactggct	gaatggcaag	3420
gagtacaagt	gcaaggtctc	caacaaagcc	ctcccagccc	ccatcgagaa	aaccatctcc	3480
aaagccaaag	ggcagccccg	agaaccacag	gtgtacaccc	tgcccccatc	ccgggatgag	3540
ctgaccaaga	accaggtcag	cctgacctgc	ctggtcaaag	gcttctatcc	cagcgacatc	3600
gccgtggagt	gggagagcaa	tgggcagccg	gagaacaact	acaagaccac	gcctcccgtg	3660
ctggactccg	acggctcctt	cttcctctac	agcaagctca	ccgtggacaa	gagcaggtgg	3720
cagcagggga	acgtcttctc	atgctccgtg	atgcatgagg	ctctgcacaa	ccactacacg	3780
cagaagagcc	tctccctgtc	tccgggtaaa	tgaggatccg	ttaacggtta	ccaactacct	3840
agactggatt	cgtgacaaca	tgcggccgtg	atatctacgt	atgatcagcc	tcgactgtgc	3900
cttctagttg	ccagccatct	gttgtttgcc	cctcccccgt	gccttccttg	accctggaag	3960
	cactgtcctt					4020
	tattctgggg					4080
	gcatgctggg					4140
	ccgatcccca					4200
	attttaacac					4260
	gacagtgttc					4320
	actcctaagc					4380
	cctgattccg					4440
	caggagccag					4500
	tgacatagtt					4560
	aaacttgacg					4620
	ttcgaccatt					4680
	acctaccctg					4740
	cttcagtgga					4800
	ctgagaagaa					4860
	aaccaccacg					4920
	aacaaccgga					4980
	accaggaagc					5040
	aatttgaaag					5100
	aatacccagg					5160
	tctacgagaa					5220
	tatgcatttt					5280
	tctagttgcc	_				5340
	gccactccca	-				5400
	tgtcattcta					5460
	aatagcaggc					5520
	agctttgctt					5580
	ccaattcagt					5640
	ctctgcacag					5700
				J~555~5040		2,00

gactcctaag	ccagtgagtg	gcacagcatt	ctagggagaa	atatgcttgt	catcaccgaa	5760
gcctgattcc	gtagagccac	accttggtaa	gggccaatct	gctcacacag	gatagagagg	5820
gcaggagcca	gggcagagca	tataaggtga	ggtaggatca	gttgctcctc	acatttgctt	5880
		gcttggatcg				5940
		gggtggagag				6000
aatcggctgc	tctgatgccg	ccgtgttccg	gctgtcagcg	caggggcgcc	cggttctttt	6060
tgtcaagacc	gacctgtccg	gtgccctgaa	tgaactgcag	gacgaggcag	cgcggctatc	6120
gtggctggcc	acgacgggcg	ttccttgcgc	agctgtgctc	gacgttgtca	ctgaagcggg	6180
aagggactgg	ctgctattgg	gcgaagtgcc	ggggcaggat	ctcctgtcat	ctcaccttgc	6240
tcctgccgag	aaagtatcca	tcatggctga	tgcaatgcgg	cggctgcata	cgcttgatcc	6300
ggctacctgc	ccattcgacc	accaagcgaa	acatcgcatc	gagcgagcac	gtacteggat	6360
ggaagccggt	cttgtcgatc	aggatgatct	ggacgaagag	catcaggggc	tcgcgccagc	6420
cgaactgttc	gccaggctca	aggcgcgcat	gcccgacggc	gaggatctcg	tcgtgaccca	6480
		atatcatggt				6540
ctgtggccgg	ctgggtgtgg	cggaccgcta	tcaggacata	gcgttggcta	cccgtgatat	6600
tgctgaagag	cttggcggcg	aatgggctga	ccgcttcctc	gtgctttacg	gtatcgccgc	6660
tcccgattcg	cagcgcatcg	ccttctatcg	ccttcttgac	gagttcttct	gagcgggact	6720
ctggggttcg	aaatgaccga	ccaagcgacg	cccaacctgc	catcacgaga	tttcgattcc	6780
accgccgcct	tctatgaaag	gttgggcttc	ggaatcgttt	tccgggacgc	cggctggatg	6840
atcctccagc	gcggggatct	catgctggag	ttcttcgccc	accccaactt	gtttattgca	6900
gcttataatg	gttacaaata	aagcaatagc	atcacaaatt	tcacaaataa	agcattttt	6960
tcactgcatt	ctagttgtgg	tttgtccaaa	ctcatcaatc	tatcttatca	tgtctggatc	7020
gcggccgcga	tcccgtcgag	agcttggcgt	aatcatggtc	atagctgttt	cctgtgtgaa	7080
attgttatcc	gctcacaatt	ccacacaaca	tacgagccgg	aagcataaag	tgtaaagcct	7140
ggggtgccta	atgagtgagc	taactcacat	taattgcgtt	gcgctcactg	cccgctttcc	7200
agtcgggaaa	cctgtcgtgc	cagctgcatt	aatgaatcgg	ccaacgcgcg	gggagaggcg	7260
gtttgcgtat	tgggcgctct	tccgcttcct	cgctcactga	ctcgctgcgc	tcggtcgttc	7320
ggctgcggcg	agcggtatca	gctcactcaa	aggcggtaat	acggttatcc	acagaatcag	7380
gggataacgc	aggaaagaac	atgtgagcaa	aaggccagca	aaaggccagg	aaccgtaaaa	7440
aggccgcgtt	gctggcgttt	ttccataggc	tccgccccc	tgacgagcat	cacaaaaatc	7500
gacgctcaag	tcagaggtgg	cgaaacccga	caggactata	aagataccag	gcgtttcccc	7560
ctggaagctc	cctcgtgcgc	tctcctgttc	cgaccctgcc	gcttaccgga	tacctgtccg	7620
		gtggcgcttt				7680
cggtgtaggt	cgttcgctcc	aagctgggct	gtgtgcacga	accccccgtt	cagcccgacc	7740
gctgcgcctt	atccggtaac	tatcgtcttg	agtccaaccc	ggtaagacac	gacttatcgc	7800
cactggcagc	agccactggt	aacaggatta	gcagagcgag	gtatgtaggc	ggtgctacag	7860
agttcttgaa	gtggtggcct	aactacggct	acactagaag	gacagtattt	ggtatctgcg	7920
ctctgctgaa	gccagttacc	ttcggaaaaa	gagttggtag	ctcttgatcc	ggcaaacaaa	7980
ccaccgctgg	tagcggtggt	ttttttgttt	gcaagcagca	gattacgcgc	agaaaaaaag	8040
gatctcaaga	agatcctttg	atcttttcta	cggggtctga	cgctcagtgg	aacgaaaact	8100
cacgttaagg	gattttggtc	atgagattat	caaaaaggat	cttcacctag	atccttttaa	8160
attaaaaatg	aagttttaaa	tcaatctaaa	gtatatatga	gtaaacttgg	tctgacagtt	8220
		gcacctatct				8280
ttgcctgact	ccccgtcgtg	tagataacta	cgatacggga	gggcttacca	tctggcccca	8340
gtgctgcaat	gataccgcga	gacccacgct	caccggctcc	agatttatca	gcaataaacc	8400
		cgcagaagtg				8460
ctattaattg	ttgccgggaa	gctagagtaa	gtagttcgcc	agttaatagt	ttgcgcaacg	8520
ttgttgccat	tgctacaggc	atcgtggtgt	cacgctcgtc	gtttggtatg	gcttcattca	8580
		aggcgagtta				8640
		atcgttgtca				8700
		aattctctta				8760
		aagtcattct				8820
		gataataccg				8880
		gggcgaaaac				8940
		gcacccaact				9000
		ggaaggcaaa				9060
ggaaatgttg	aatactcata	ctcttccttt	ttcaatatta	ttgaagcatt	tatcagggtt	9120

```
attgtctcat gagcggatac atatttgaat gtatttagaa aaataaacaa ataqqqqttc
                                                                     9180
cgcgcacatt tccccgaaaa gtgccacct
                                                                     9209
<210> 3
<211> 384
<212> DNA
<213> Mus musculus
<400> 3
atggattttc aggtgcagat tatcagcttc ctgctaatca gtgcttcagt cataatgtcc
                                                                      60
agagggcaaa ttgttctctc ccagtctcca gcaatcctgt ctgcatctcc aggggagaag
                                                                      120
gtcacaatga cttgcagggc cagcctgtct gcatctccag gggagaaggt cacaatgact
                                                                      180
tgcagggcca gccccaaacc ctggatttat gccacatcca acctggcttc tggagtccct
                                                                      240
gttcgcttca gtggcagtgg gtctgggact tcttactctc tcacaatcag cagagtggag
                                                                      300
gctgaagatg ctgccactta ttactgccag cagtggacta gtaacccacc cacgttcgga
                                                                      360
ggggggacca agctggaaat caaa
                                                                      384
<210> 4
<211> 128
<212> PRT
<213> Mus musculus
<400> 4
Met Asp Phe Gln Val Gln Ile Ile Ser Phe Leu Leu Ile Ser Ala Ser
                                    10
Val Ile Met Ser Arg Gly Gln Ile Val Leu Ser Gln Ser Pro Ala Ile
Leu Ser Ala Ser Pro Gly Glu Lys Val Thr Met Thr Cys Arg Ala Ser
                            40
Ser Ser Val Ser Tyr Ile His Trp Phe Gln Gln Lys Pro Gly Ser Ser
                        55
Pro Lys Pro Trp Ile Tyr Ala Thr Ser Asn Leu Ala Ser Gly Val Pro
                    70
                                        75
Val Arg Phe Ser Gly Ser Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile
                                    90
                85
Ser Arg Val Glu Ala Glu Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Trp
                                105
Thr Ser Asn Pro Pro Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys
<210> 5
<211> 420
<212> DNA
<213> Mus musculus
<400> 5
atgggttgga gcctcatctt gctcttcctt gtcgctgttg ctacgcgtgt cctgtcccag
                                                                       60
gtacaactgc agcagcctgg ggctgagctg gtgaagcctg gggcctcagt gaagatgtcc
                                                                      120
tgcaaggett ctggctacac atttaccagt tacaatatgc actgggtaaa acagacacct
                                                                      180
ggtcggggcc tggaatggat tggagctatt tatcccggaa atggtgatac ttcctacaat
                                                                      240
cagaagttca aaggcaaggc cacattgact gcagacaaat cctccagcac agcctacatg
                                                                      300
cageteagea geetgacate tgaggaetet geggtetatt aetgtgeaag ategaettae
                                                                      360
tacggcggtg actggtactt caatgtctgg ggcgcaggga ccacggtcac cgtctctgca
                                                                      420
<210> 6
<211> 140
<212> PRT
```

<213> Mus musculus

```
<400> 6
Met Gly Trp Ser Leu Ile Leu Leu Phe Leu Val Ala Val Ala Thr Arg
Val Leu Ser Gln Val Gln Leu Gln Gln Pro Gly Ala Glu Leu Val Lys
                               25
Pro Gly Ala Ser Val Lys Met Ser Cys Lys Ala Ser Gly Tyr Thr Phe
                           40
Thr Ser Tyr Asn Met His Trp Val Lys Gln Thr Pro Gly Arg Gly Leu
Glu Trp Ile Gly Ala Ile Tyr Pro Gly Asn Gly Asp Thr Ser Tyr Asn
                                        75
Gln Lys Phe Lys Gly Lys Ala Thr Leu Thr Ala Asp Lys Ser Ser Ser
                                    90
Thr Ala Tyr Met Gln Leu Ser Ser Leu Thr Ser Glu Asp Ser Ala Val
           100
                               105
Tyr Tyr Cys Ala Arg Ser Thr Tyr Tyr Gly Gly Asp Trp Tyr Phe Asn
                           120
Val Trp Gly Ala Gly Thr Thr Val Thr Val Ser Ala
                      135
<210> 7
<211> 27
<212> DNA
<213> Artificial Sequence
<220>
<223> impaired Kozak sequence and restriction enzyme site
gggagcttgg atcgatcctc tatggtt
                                                                      27
<210> 8
<211> 47
<212> DNA
<213> Artificial Sequence
<220>
<223> PCR Primer
atcacagatc tctcaccatg gattttcagg tgcagattat cagcttc
                                                                      47
<210> 9
<211> 30
<212> DNA
<213> Artificial Sequence
<220>
<223> PCR Primer
<400> 9
                                                                      30
tgcagcatcc gtacgtttga tttccagctt
<210> 10
<211> 27
```

```
<212> DNA
<213> Artificial Sequence
<220>
<223> PCR Primer
<400> 10
gcggctccca cgcgtgtcct gtcccag
                                                                           27
<210> 11
<211> 29
<212> DNA
<213> Artificial Sequence
<220>
<223> PCR Primer
<220>
<221> misc_feature <222> (1)..(29)
<223> s is g or c
<220>
<221> misc_feature
<222> (1)..(29)
<223> m is a or c
<220>
<221> misc_feature
<222> (1)..(29)
<223> r is g or a
<400> 11
                                                                           29
ggstgttgtg ctagctgmrg agacrgtga
```